

# PATENT SPECIFICATION

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## (54) AN ELECTROMAGNETIC IMPACT VIBRATOR

(71) We, LICENTIA PATENT VERWALTUNGS G.M.B.H., of 1 Theodor-Stern-Kai, 6 Frankfurt/Main 70, Federal Republic of Germany, a German body corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to an electromagnetic impact vibrator having a rhythmical hammer function.

These impact vibrators are necessary in order to prevent bulk goods from caking to the walls in silo outlets and filling plant and in order to prevent bridge formation. These impact vibrators have an electromagnetic system which is excited by an alternating current or a pulsating direct current whereby a hammer is connected to one part of the magnet system and an impact surface is connected to the other part, against which surface the hammer hits during oscillation of the system, so that the device transmits hard periodic impacts to the support in rhythm with the frequency of the magnetic attraction. The spring tensioned between the two masses acts as an energy store for the structure oscillating close to its natural resonance and generally has the task moreover of guiding the oscillation movement in linear manner. These springs can be steel springs but many embodiments are known using rubber springs.

15 In the case of using rubber springs specially designed and manufactured rubber elements were necessary or large and expensive grading work was necessary in order to select those elements from the commercial rubber elements which have the required E-modulus for the intended purpose. Here too there are difficulties as regards balance and alignment. Designs using steel springs are generally expensive, special additional linear guide elements are necessary with helical springs, special types of fixing and elements for compensating the change in length when there is an oscillatory deflection are necessary in leaf

springs.

The invention seeks to provide an impact vibrator which can be assembled from a small number of parts and can be easily assembled which is particularly reliable as a result of its simple construction.

According to the invention there is provided an electromagnetic impact vibrator comprising a substantially U-shaped spring, an electromagnet having an open core mounted on one limb in the spacing between the limbs so that the other limb forms an armature for closing the magnetic circuit of the open core and an impact body mounted on the said other limb.

Preferably the armature limb is longer than the said one limb and has its impact body extending transversely of the cavity of the U. The impact body may be arranged to hit a support to which the said one limb is fixed during oscillation of the armature limb.

A particularly advantageous construction in accordance with the invention has the further advantage that, as a result of the lever arm ratios of the armaturing limb with relatively small oscillation of the air gap in the exciter system, which has a low drawing of reactive current as its result, a large amplitude of oscillation of the hammer is achieved with a correspondingly larger inertia.

In order that the invention and its various other preferred features may be understood more easily, an embodiment thereof will now be described, by way of example only, with reference to the drawing which is an elevational view of an impact vibrator constructed in accordance with the invention.

A spring 1 bent in U-shape has a fairly short limb 1a and a longer limb 1b. The longer limb 1b serves at the same time as an armature for a magnet system 2 made of an open core and a winding which is arranged between the limbs 1a and 1b and forms an oscillating air gap with the limb 1b.

A plunger-like hammer 3 possibly having a broadened hammer surface 5 is arranged

on the projecting end of the longer limb 1b said hammer hammering against the support (not shown) and bridging the open opening of the U-shaped spring, the other limb of the U-shaped spring having the magnet system affixed thereto is screwed on to the support, possibly with interposition of a baseplate 4 provided for example with fixing bores and whereby the hammer or support can comprise non-metallic material in order to reduce noise.

WHAT WE CLAIM IS:—

1. An electromagnetic impact vibrator comprising a substantially U-shaped spring, an electromagnet having an open core mounted on one limb in the spacing between the limbs so that the other limb forms an armature for closing the magnetic circuit of the open core and an impact body mounted on the said other limb.

2. An electromagnetic impact vibrator according to claim 1, wherein the armature limb is longer than the said one limb and has its impact body extending transversely of the cavity of the U.

3. An electromagnetic impact vibrator according to claim 2, wherein the impact body is arranged to hit a support on which the said one limb is fixed, during oscillation of the armature limb.

4. An electromagnetic impact vibrator according to any one of Claims 1 to 3, wherein the said one limb and the electromagnet are fixed to a common baseplate, which baseplate has means for fixing it

to a support.

5. An electromagnetic impact vibrator according to any one of Claims 1 to 4, wherein the impact body is of plunger shape of circular cross section.

6. An electromagnetic impact vibrator according to Claim 5, wherein the impact body has a broadened impact surface.

7. An electromagnetic impact vibrator according to Claim 5, or 6, wherein a corresponding anvil or block is provided, opposite the impact body, on the support.

8. An electromagnetic impact vibrator according to any of Claims 1 to 7, wherein the leaf spring is used simultaneously for energy storage, as a free mass, an armature, baseplate connection of the electromagnet as the mounting for the impact body which is adjustable in height, a lever for the larger impact effect, and for guidance in a straight line.

9. An electromagnetic impact vibrator according to Claim 7, wherein the impact surface and the corresponding anvil or block on the support comprises a non-metallic material.

10. An electromagnetic impact vibrator substantially as described herein with reference to, and as illustrated in the drawing.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

